

## 299-E33-44 (B8554) Log Data Report

### Borehole Information:

<b>Borehole:</b> 299-E33-44 (B8554)		<b>Site:</b> 216 B-7A and B Crib			
<b>Coordinates (WA St Plane)</b>		<b>GWL<sup>1</sup> (ft):</b> 244.3	<b>GWL Date:</b> 05/02		
<b>North</b>	<b>East</b>	<b>Drill Date</b>	<b>TOC<sup>2</sup> Elevation</b>	<b>Total Depth (ft)</b>	<b>Type</b>
137369.94 m	573707.19 m	09/98	unknown	255	cable tool

### Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Steel threaded	2.45	8	7.75	0.125	0	9.8
ss – schedule 5	1.55	N/A <sup>3</sup>	4	0.125	0.9	238
ss wire wrap screen	None	N/A	4	0.125	238	253

### Borehole Notes:

The casing depth information provided above is derived from *Summaries of Well Construction Data and Field Observations for Existing 200-East Aggregate Operable Unit Resource Protection Wells* (Ledgerwood 1992). Stoller personnel measured the 8-in. casing wall thickness and the outside diameter; the inside diameter is calculated. The stainless steel casing is threaded with reinforced joints. The casing thickness is estimated at 0.125 in. for both the 4-in. ID casing and screen. Groundwater level is derived from Stoller measurements from the top of the 8-in. casing at the time of logging. Coordinates are derived from HWIS<sup>4</sup>; the TOC is not reported.

### Logging Equipment Information:

<b>Logging System:</b> Gamma 2A	<b>Type:</b> SGLS (35%)
<b>Calibration Date:</b> 11/01	<b>Calibration Reference:</b> GJO-2002-286-TAR
<b>Logging Procedure:</b> MAC-HGLP 1.6.5, Rev. 0	

### Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3		
Date	05/16/02	05/17/02	05/22/02		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth	3.0	21.0	71.0		
Finish Depth	22.0	72.0	133.0		
Count Time (sec)	200	200	200		
Live/Real	R	R	R		
Shield (Y/N)	N	N	N		
MSA Interval (ft)	1.0	1.0	1.0		
ft/min	n/a	n/a	n/a		
Pre-Verification	BA152CAB	BA154CAB	BA157CAB		
Start File	BA153000	BA154000	BA157000		

Log Run	1	2	3		
Finish File	BA153019	BA154051	BA157062		
Post-Verification	BA153CAA	BA154CAA	None		

### **Logging Operation Notes:**

Spectral gamma logging was performed in this borehole during May 2002 on three separate days. Logging measurements are referenced to the top of the 8-in. casing. Data were collected at 1-ft depth increments at 200-s counting times. During logging on 5/22/02 (log run 3) the sonde encountered a snag in the borehole at 81 ft in depth and logging activities were terminated. The sonde was retrieved from the bottom of the borehole on June 4. No data were collected below 133 ft. No data repeat section was acquired in this borehole.

### **Analysis Notes:**

<b>Analyst:</b>	Henwood	<b>Date:</b>	07/29/02	<b>Reference:</b>	
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Pre-run and post-run verifications of the logging system were performed for the first two logging runs; a post-run was not collected for the third log run because the logging sonde was lost. The acceptance criteria were met for the verification data. Post-run verifications were used for the energy and resolution calibration necessary to process the data for log runs 1 and 2 and the pre-run verification was used for log run 3.

A casing correction for a 0.125-in.-thick casing was applied for the 4-in. stainless-steel casing and screen. The correction for the top 9.8 ft (from TOC) was 0.250-in. (0.125 + 0.125 for the 8- and 4-in. casings, respectively).

Each spectrum collected during a log run was processed in batch mode using APTEC Supervisor to identify individual energy peaks and determine count rates. Concentrations were calculated with an Excel worksheet template identified as G2ANOV01.xls using an efficiency function and corrections for casing as appropriate; no dead time or water corrections were necessary. The  $^{214}\text{Bi}$  peak at 609 keV was used to determine the naturally occurring  $^{238}\text{U}$  concentrations rather than the  $^{214}\text{Bi}$  peak at 1764 keV. The 609-keV energy peak exhibited slightly better count rates than the 1764-keV peak.

### **Log Plot Notes:**

Separate log plots are provided for the man-made radionuclide ( $^{137}\text{Cs}$ ) detected in the borehole, naturally occurring radionuclides ( $^{40}\text{K}$ ,  $^{238}\text{U}$ ,  $^{232}\text{Th}$  [KUT]), and a combination of man-made, KUT, total gamma, and dead time. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, casing corrections, or water corrections. These errors are discussed in the calibration report. A separate log plot is provided that shows data for the entire borehole collected by Waste Management Federal Services Northwest (WMFS-NW) in 1998 with the Radionuclide Logging System-2 (RLS-2).

### **Results and Interpretations:**

The man-made radionuclide detected in this borehole by the SGLS was  $^{137}\text{Cs}$ .  $^{137}\text{Cs}$  was measured between 5 and 12 ft with a maximum concentration of about 2 pCi/g at 5 ft in depth. The remainder of the logged interval to 133 ft showed no contamination.

The KUT concentrations appear to be influenced by the well completion materials and are probably not useful for stratigraphic correlations between boreholes. Between 9.8 ft and 199 ft “medium bentonite chunks” were placed in the annular space of the borehole.

A log plot is included that shows data collected with WMFS-NW’s RLS-2 in 1998. The RLS-2 is a sodium-iodide (NaI) detection system that is only calibrated for the natural radionuclides and not man-made radionuclides. It is not known if the relatively higher total gamma counts at intervals of about 166, 205, and 248 ft are man-made contaminants or perhaps related to the well construction materials. It is recommended the borehole be relogged with a spectral gamma logging system that is capable of entering the 4-in. casing without becoming lodged inside the casing.

### **References:**

Ledgerwood, R.K., 1993. *Summaries of Well Construction Data and Field Observations for Existing 200 East Resource Protection Wells*, WHC-SD-ER-TI-007, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

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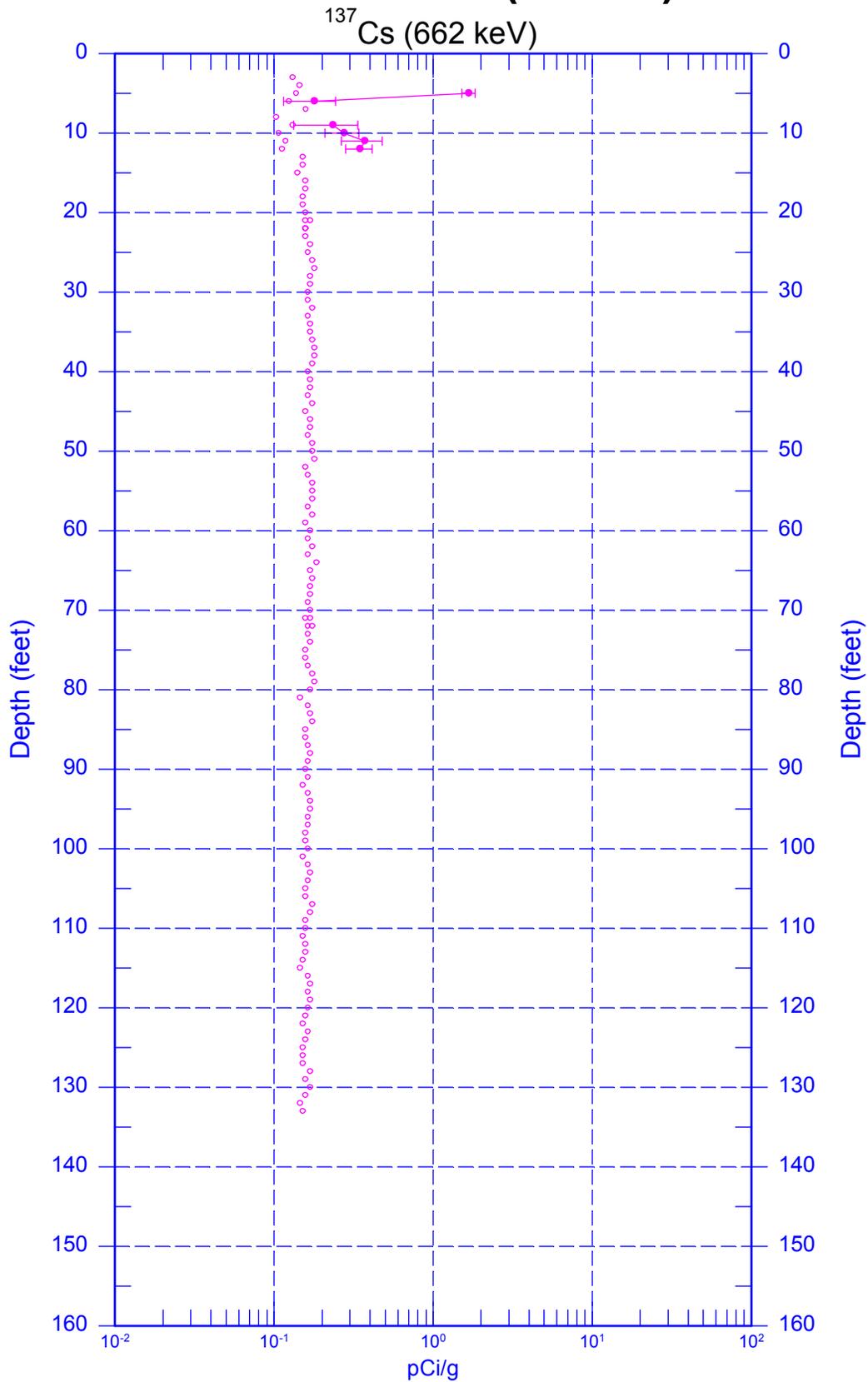
<sup>1</sup> GWL – groundwater level

<sup>2</sup> TOC – top of casing

<sup>3</sup> n/a – not applicable

<sup>4</sup> HWIS – Hanford Well Information System

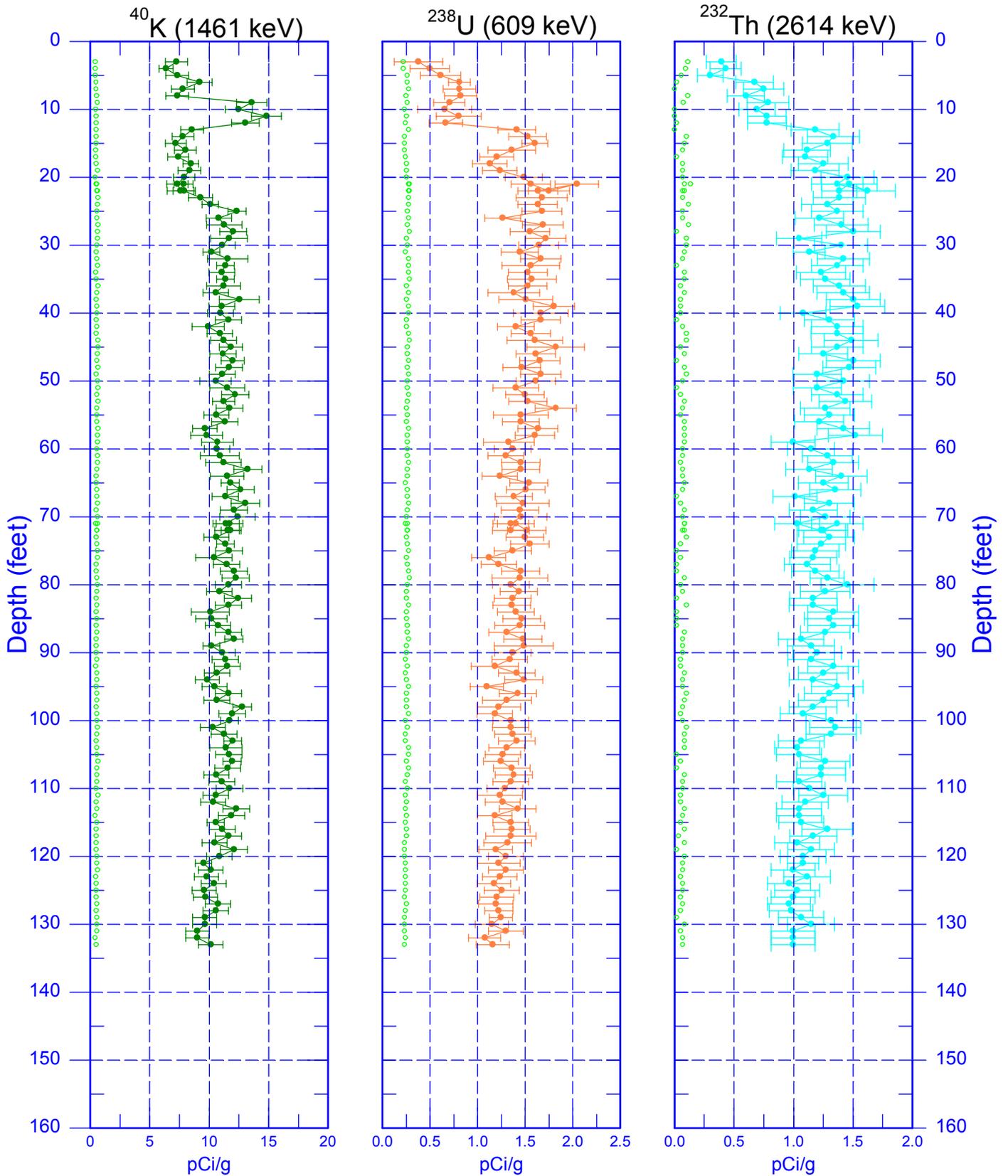
# 299-E33-44 (B8554)



Zero Reference - Top of Casing

Date of Last Logging Run  
05/22/02

# 299-E33-44 (B8554) Natural Gamma Logs

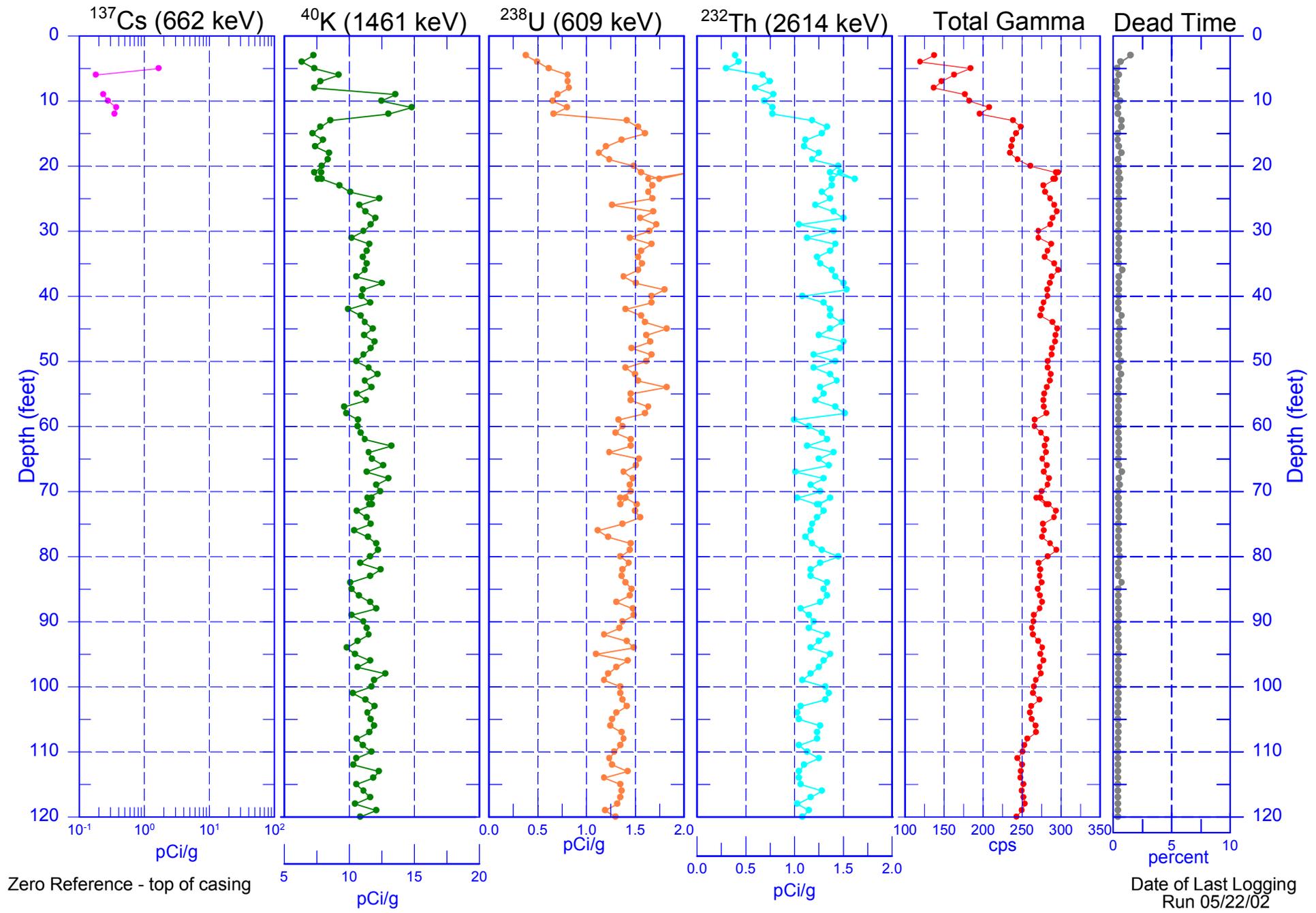


Zero Reference - top of casing

○ MDL

Date of Last Logging Run  
05/22/02

# 299-E33-44 (B8554) Combination Plot



# 299-E33-44 (B8554) Combination Plot

